

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1-2 (cancelled).

Claim 3 (currently amended) A method of controlling a chemical reaction comprising the steps of:

- a) providing to a chemical reactor a liquid continuous sample selected from the group including: a single component liquid; a multi-component liquid; and, a liquid continuous multi-phase system;
- b) applying to the liquid continuous sample an electric field having a carrying frequency greater than 100 kHz and less than 200 GHz and no limitation on the modulation of the electric field, wherein the amplitude of the electric field is sufficient to cause at least one of a dielectric breakdown condition and a dielectric pre-breakdown condition within the liquid continuous sample;
- c) detecting an indication of at least one of the dielectric breakdown condition and the dielectric pre-breakdown condition within the liquid continuous sample resulting from the applied electric field; and,
- d) controlling the chemical reaction process in dependence upon a feedback signal related to the indication of at least one of the dielectric breakdown condition and the dielectric pre-breakdown condition.

Claim 4 (original) A method as defined in claim 3 wherein the frequency of the electric field is selected to be in resonance with a response frequency of at least one of a component and a phase of the liquid continuous sample.

Claim 5 (original) A method as defined in claim 3 including the step of applying to the liquid continuous sample a second carrying frequency, the second carrying frequency in

resonance with a response frequency of at least one of a second component and a second phase of the liquid continuous sample.

Claim 6 (original) A method as defined in claim 3 including the step of applying to the liquid continuous sample an additional low frequency electric field within the industrial range of 50 Hz to 60 Hz.

Claim 7 (original) A method as defined in claim 3 including the step of applying to the liquid continuous sample an additional DC electric field.

Claim 8 (original). A method as defined in claim 3 including the step of applying to the liquid continuous sample an additional magnetic field.

Claim 9 (original) A method as defined in claim 3 including the step of adding a chemical compound to the liquid continuous sample for enhancement of the chemical reaction.

Claim 10 (original) A method as defined in claim 3 including the step of providing a flow of a gas through the liquid continuous sample, the gas being provided from a source external to the chemical reactor.

Claim 11 (original) A method as defined in claim 3 including the step of affecting the temperature of the liquid continuous sample.

Claim 12 (original) A method as defined in claim 3 including the step of separating at least one of a gaseous reaction product and a solid reaction product from the liquid continuous sample.

Claim 13 (original) A method as defined in claim 3 wherein the liquid continuous sample is a toxic liquid for destruction within the chemical reactor absent combustion.

Claim 14 (original) A method as defined in claim 3 wherein the liquid continuous sample is a petroleum product for upgrading within the chemical reactor.

Claim 15 (original) A method as defined in claim 3 wherein the liquid continuous sample is a precursor for the production of chemical compounds for the chemical storage of renewable energy.

Claims 16-51 (cancelled).

Claim 52 (currently amended) A method of controlling a chemical reaction comprising the steps of:

- a) providing a liquid sample to a reactor having a reaction chamber for accommodating the liquid sample therein;
- b) applying to the liquid sample an electric field having a carrying frequency and an amplitude sufficient to cause at least one of a dielectric breakdown condition and a dielectric pre-breakdown condition within the liquid sample;
- c) detecting an indication of at least one of the dielectric breakdown condition and the dielectric pre-breakdown condition within the liquid sample resulting from the applied electric field; and,
- d) controlling the chemical reaction ~~process~~ in dependence upon a feedback signal related to the indication of at least one of the dielectric breakdown condition and the dielectric pre-breakdown condition.

Claim 53 (original) A method as defined in claim 52 wherein the carrying frequency is higher than 100 kHz.

Claim 54 (original) A method as defined in claim 53 wherein the carrying frequency is selected from a range of frequencies between 100 kHz and 200 GHz.

Claim 55 (original) A method as defined in claim 54 wherein the carrying frequency of the electric field is selected in dependence upon the dielectric properties of the liquid sample.

Claim 56 (original) A method as defined in claim 55 wherein a second other carrying frequency of the electric field is selected in dependence upon the dielectric properties of the liquid sample to control a second other chemical reaction.

Claim 57 (original) A method as defined in claim 55 wherein the step of applying the electric field includes the step of adjusting at least one of a shape, duration, carrying frequency and amplitude of the electric field for inducing a dielectric pre-breakdown condition within the liquid sample.

Claim 58 (original) A method as defined in claim 55 wherein the step of applying the electric field includes the step of adjusting at least one of a shape, duration, carrying frequency and amplitude of the electric field for inducing a dielectric breakdown condition within the liquid sample.

Claim 59 (original) A method as defined in claim 55 wherein the step of applying the electric field includes the step of adjusting at least one of a shape, duration, carrying frequency and amplitude of the electric field for providing resonant conditions under which a reaction rate of the chemical reaction is increased.

Claim 60 (original) A method as defined in claim 52 wherein the liquid sample is one of a single component and a multi-component liquid sample.

Claim 61 (original) A method as defined in claim 60 wherein the liquid sample is a liquid continuous multi-phase system.

Claim 62 (original) A method as defined in claim 60 wherein the liquid sample is a petroleum product.

Claim 63 (original) A method as defined in claim 60 wherein the liquid sample is selected from liquid samples that behave substantially as a dielectric when the electric field is below 60 Hz and exhibits an increased electric conductivity when the electric field is above 100 kHz.

Claim 64 (original) A method as defined in claim 63 wherein the step of applying an electric field comprises the step of providing a first electrode and a second electrode.

Claim 65 (currently amended) A method as defined in claim 59 comprising the step of providing an acoustic sensor for detecting an indication of the dielectric pre-breakdown condition.

Claim 66 (original) A method as defined in claim 59 comprising the step of providing a temperature sensor for detecting a temperature within the reactor.

Claim 67 (original) A method as defined in claim 66 comprising the step of increasing the temperature of the liquid sample within the reactor.

Claim 68 (original) A method as defined in claim 66 comprising the step of providing a gas flow meter for detecting at least one of the presence and amount of at least a gas within the reactor.

Claim 69 (original) A method as defined in claim 68 comprising the step of providing a flow of a predetermined gas within the reaction chamber.